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ORIGINAL ARTICLE

STUDY OF WATER QUALITY USING PHYSICO-CHEMICAL PARAMETERS OF GANGASAGAR POND AT DARBHANGA DISTRICT, BIHAR

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Abstract:

This Paper Present to study of the Physico-chemical Parameters of Gangasagar pond at Darbhanga District, Bihar. Monthly Changes In Physical and Chemical Parameters Such as Water Temperature, Transparency, Turbidity, Total Dissolved Solids, pH, Dissolved Oxygen, Free Carbon dioxide, and Total Hardness, Chlorides, Alkalinity, Phosphate and Nitrates. Were analyzed for a periods of one year from 1st January 2011 to 31st December 2011. All Parameters were within the Permissible limits.

KEYWORDS:

Gangasagar pond, Physico-Chemical Parameters, Monthly Variation.

INTRODUCTION:

Darbhanga is categorized as one of the fastest growing cities in Bihar with rapid development and exploding population resulting in urbanization. Demand for water supply has this been increasing constantly.

Water constitutes about 71% of earth surface. Of the surface water about 97% is salt water and remainder fresh water. Water helps maintain earth climate and dilutes environmental pollutants. Water is one of the most essential substances in our life. It makeup about 50% to 97% of the total weight of plants and animals and about 70% of our body. It is also a vital resource for agriculture, manufacturing, transportation and countless human activities. It is therefore an essential factor in the economics, social and cultural development of a community and a nation. The pollution of ground water is of major concern firstly because of its increasing utilization for human needs and secondly because of the ill effects of the increasing industrial activities. Sources of ground water pollution include sewers leakage in proper disposal of liquid wastes and solid wastes. Sewer leakage can also contribute pollution to certain extent by introducing high organic pollution, nitrate and chemicals and possibly bacteria into ground water.

Ground water pollution can occur where industrial waste water is discharged into nalas, ponds and rivers.

Darbhanga, the divisional headquarters of land locked state of Bihar bounds in ponds and hence, often called as city of ponds[1]

The pond water is basically used for Domestic, and Fisheries Activity. In India Still now several Researchers have done Study on Physicochemical and Biological characteristic of Standing and Running Water Resources [2-4]

The objective of this work has to analyze various physic-chemical parameters of the pond water at Darbhanga District, Bihar

Title :STUDY OF WATER QUALITY USING PHYSICO-CHEMICAL PARAMETERS OF GANGASAGAR POND AT DARBHANGA DISTRICT, BIHAR Source:Indian Streams Research Journal [2230-7850] SHAKEBA FARNAZ AND MD. RAHMATULLAH yr:2013 vol:3 iss:3

MATERIALS AND METHODS

The Water Samples from Gangasagar Pond were collected from four Different Stations in the Morning Hours between 9 to 11am, in Polythene Bottle Regularly for Every Month. The Water samples were immediately brought into Laboratory for the Estimation of various Physico-chemical Parameters like Water Temperature Transparency and pH were recorded at the time of Sample Collection, by using Thermometer and Pocket Digital pH Meter. Transparency was measured with the help of Secchi Disc. while other Parameters Such as DO, TDS, Free CO2, Hardness, Chlorides, Alkalinity, Phosphate and Nitrate were Estimated in the Laboratory By using Standard Methods as Prescribed By APHA, AWWA, [5], Trivedy and Goel [3], Kodarkar [4].

RESULTS AND DISCUSSION:-

The Monthly Variation in Physico-chemical Parameters is presented in Table.

Table 1: Physical parameters of Gangasagar Pond district, Darbhanga

Month	Temperature ^{0}C	Transparency cm	Turbidity NTU	TDS gm/lit	pH
Jan	23	12	9.95	0.37	8.4
Feb	25	10.5	12.41	0.39	8.4
Mar	26	9.75	12.2	0.4	8.8
Apr	23.5	7.5	8.4	0.1	8.3
May	25	6.0	7.1	0.6	8.0
Jun	23.5	9.5	11.6	2.2	8.1
Jul	23.5	60.75	1.0	1.13	8.1
Aug	24.5	61.75	2.2	0.2	8.3
Sept	25.5	58.5	2.2	0.3	7.3
Oct	25	92.0	0.4	0.4	7.5
Nov	24	82.5	1.35	1.8	7.9
Dec	22.5	67.25	1.8	0.4	8.2

Biostatistical Analysis of Physical Parameters of Gangasagar Pond district, Darbhanga

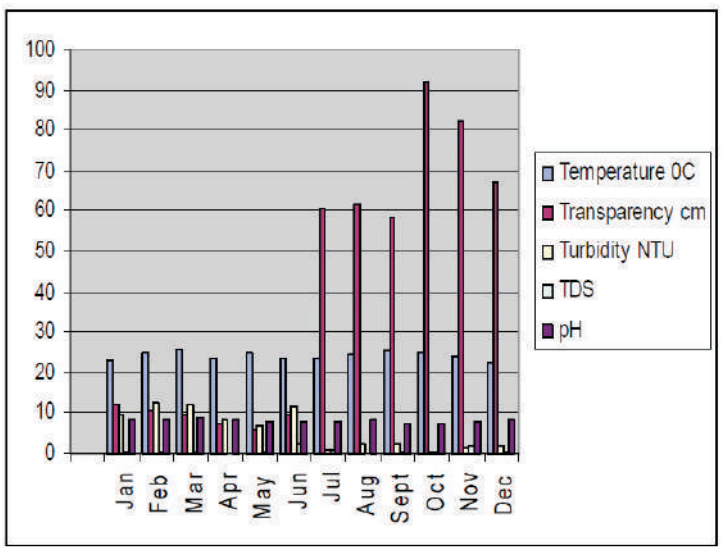
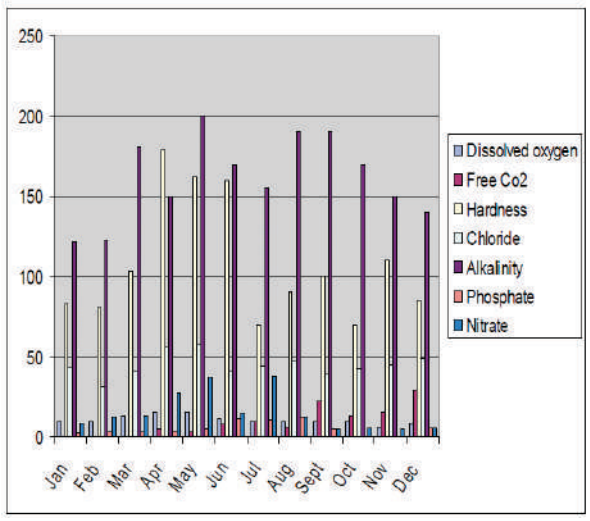


Table 2: Chemical parameters of Gangasagar Pond district, Darbhanga

Months	Dissolved oxygen	Free Co_2	Hardness	Chloride	Alkalinity	Phosphate	Nitrate
Jan	8.85	-	82.5	43.48	121.25	1.91	8.43
Feb	9.06	-	80.25	31.06	122.50	3.38	11.84
Mar	12.52	-	103	41.0	180	3.39	12.9
Apr	15.1	4.4	179	55.38	150	4.14	26.90
May	15.5	3.4	162	57.61	200	4.8	36.84
Jun	11.19	7.6	160	41.17	170	11.12	14.25
Jul	9.04	8.8	70	44.02	155	10.68	37.8
Aug	8.79	6.0	90	47.57	190	12.38	12.02
Sept	9.05	22	100	38.34	190	4.58	4.58
Oct	8.82	13.2	70	42.6	170	0.12	5.43
Nov	6.40	15.4	110	44.55	150	0.19	4.40
Dec	8.21	28.6	85	48.61	140	5.16	5.25

Value Expressed in Mg/Lit

Biostatistical Analysis of Chemical Parameters of Gangasagar Pond district, Darbhanga



Water Temperature – In The Present Study of the Water Temperature Ranges From22.5°c to 26°C.

The Maximum (26°C) Temperature was recorded in the Month of March (summer) and minimum (22.5°C) in the month of December (winter). It showed that Higher Temperature in summer and relatively lowers in winter. Similar study, Jayabhaye et al;[6] , Salve and Hiware[7], Observed that during Summer, Water Temperature was high due to Low Water Level, High Temperature and clear atmosphere. Water Temperature Plays an Important Factor which Influences the chemical, Biochemical and Biological characteristics of water body.

Water transparency- Transparency of Water Fluctuates from 6.0 cm to 92.0 cm. The Maximum (92.0cm)

was recorded in the month of October (winter) and minimum (6.0cm) in the month of May during summer. Khan and Chowdhury [8] reported that higher transparency occurred, during winter and summer due to absence of rain, runoff and flood water as well as gradual settling of suspended particles. Kadam, et al; [9], also reported similar observation.

Turbidity- The turbidity of water fluctuates from 0.4 NTU to 12.41 NTU. The maximum values (12.14 NTU) was recorded in the month of February (summer) It might be due to human activities, decrease in the water level and presence of suspended particulate matter, and minimum value (0.4NTU) in the month of October.

Total dissolved solids- The total dissolved solids fluctuate from 0.1g/l to 2.2g/l. the maximum value (2.2g/l) was recorded in the month of June. It is due to heavy rainfall and minimum value (0.1g/l) in the month of April.

pH- The pH was alkaline values ranges from 7.3 to 8.8. The maximum pH value (8.8) was recorded in the month of May (summer) and minimum (7.3) in the month of September. The factors like air temperature bring about changes the pH of water. Most of bio-chemical and chemical reactions are influenced by the pH. The reduced rate of photosynthetic activities reduces the assimilation of carbon dioxide and bicarbonates which are ultimately responsible for increase in pH, the low oxygen values coincided with high temperature during the summer month [10].

Dissolved Oxygen- The values of DO fluctuates from 6.40 mg/l to 15.5 mg/l. The maximum values (15.5 mg/l) was recorded in the month of May (summer) and minimum values (6.40 mg/l) in the month of November (winter). The high DO in summer is due to increase in temperature and duration of bright sunlight has influence on the % of soluble gases (O^2 & Co^2). The long days and intense sunlight during summer seem to accelerate photosynthesis by phytoplankton, utilizing Co2 and giving off oxygen. This possibly accounts for the greater qualities of O2 recorded during summer. The quality is slightly lesser during winter, reported by [11].

Free Carbon dioxide- The value of free Co2 ranges from 0.0 mg/l to28.6 mg/l. The maximum value (28.6 mg/l) was recorded in the month of December (winter) and minimum value (0.0mg/l) in the month of January to March. This may be depends upon alkalinity and hardness of water body. The value of CO2 was high in December. This could be related to the high rate of decomposition in the warmer months.

Hardness – The value of hardness fluctuates from 70 mg/l to 179mg/l. The maximum value (179 mg/l) was recorded in the month of April (summer) and minimum value (70 mg/l) in the month of October. Hujare [12] was reported total hardness was high during summer than monsoon and winter. High value of hardness during summer can be attributed to decrease in water volume and increase of rate of evaporation of water. Similar results were obtained in the present study.

Chlorides- The values of chlorides range from 31.06 mg/l to 57.61 mg/l. The maximum value (57.61 mg/l) was recorded in the month of May (summer) and minimum value (31.06 mg/l) in the month of February. In the present study maximum value of chloride reaches in summer. Similar results were reported by Swarnalatha and Narsing rao [13].

Alkalinity – Total alkalinity ranges from 121.25 mg/l to 200mg/l. the maximum value (200 mg/l) was recorded in the month of May (summer) and minimum value (121.25 mg/l) in the month of January (winter). The alkalinity was maximum value in April (summer) due to increase in bicarbonates in the water. Hujare [11] also reported similar results that it was maximum in summer and minimum in winter due to high photosynthetic rate.

Phosphate – The value of phosphate fluctuates from 0.12mg/l to 12.38 mg/l. the maximum value (12.38mg/l) was recorded in the month of August (monsoon) and minimum value in the month of October (winter). The high values of phosphate in August (monsoon) months are mainly due to rain, surface water runoff, agriculture run off; washer man activity could have also contributed to the inorganic phosphate content. Similar results reported by Arvindkumar [14].

Nitrates – The values of nitrate ranges from 4.40mg/l to 37.5 mg/l. the maximum value (37.5mg/l) was observed in the month of July (monsoon) and minimum (4.40mg/l) in the month of November (winter).

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